

## PROCEEDINGS OF THE CLUB

### MEETING OF FEBRUARY 5, 1929

This meeting was held at the American Museum of Natural History with forty three members present. President Denslow called the meeting to order at 8 P. M.

The following new members were elected:

Mr. Edmund H. Fulling, 205 White Plains Road, Tucka-hoe, New York; Dr. E. E. Dale, Hunter College, 145 East 32nd Street, New York City; Miss Rebecca Feinberg, 1225 Eastern Parkway, Brooklyn, New York; Mrs. Wm. Gavin Taylor, The Beechmont, Arlington, New Jersey; Miss Ruth M. Patrick, Coker College, Hartsville, South Carolina.

Mr. Austin F. Hawes, State Forester of Connecticut gave an illustrated lecture on "Our National Parks and Forests," telling of the purposes of each, their management, and their great recreational advantages as well as their importance in the conservation of wild life. This was admirably illustrated by a large number of lantern slides.

After the lecture, the meeting was adjourned to refreshments of coffee and cake, provided by the entertainment committee, served in the hall of flying birds of the Museum, by Mrs. G. T. Hastings.

FORMAN T. MCLEAN, *Secretary*

### MEETING OF FEBRUARY 20

This meeting was held at The New York Botanical Garden with sixteen members present. Minutes of the meetings of January 16th, and of February 5th, were read and approved.

The following new members were proposed and unanimously elected:

Mr. Albert C. Smith, Mr. George E. Brownell, Mr. J. H. Parker, and Miss Dora Elpern.

The resignations of Mr. Abraham Schur and Miss Mary E. Wood were accepted with regret.

Mrs Wanda K. Farr of the Boyce Thompson Institute spoke on "Studies on the Growth of Root Hairs in Solutions."

The choice of experimental material for studies in cell-enlargement is not at all simple. An aquatic form in which

single cells are visible and easily manipulated is preferable because of the ability to obtain more constant nutrient conditions. If successive measurements are to be made over a period of time, it is also desirable that the cells be stationary. It is almost necessary that the enlargement take place in only one direction so that the increments may represent as nearly as possible the absolute growth during the period of observation. It is also a matter of decided advantage that large numbers of cells may be located in a field of the microscope so that their increases in size may be measured simultaneously. One must certainly have an abundance of material of the same physiological age.

The root hairs of many terrestrial plants would seem to possess all of these requirements. Seedlings may, in many cases be produced within a moist chamber within a short period of time, furnishing an almost unlimited amount of material. The seedlings of many kinds of plants will continue to form root hairs when they are transferred to a nutrient culture solution.

#### ORIGIN OF ROOT HAIRS

Each root hair is an extension of a single epidermal cell which is subject to neither division nor marked differentiation throughout its normal development. The usual direction of growth is in a line perpendicular to the main axis of the root.

Even a brief resume of the various theories concerning the development and function of root hairs would require more time than is available. If I may summarize, with no sense of finality, the following points may serve to present the ideas now considered to be most tenable. From the experiments of Reinhardt in which he placed minute particles of red lead upon the tip of the root hair and watched the change of position as the hair grew, we may believe that some root hairs grow at the tip. That this method of growth is not universal, however, has been shown more recently by Ziegenspek. He has found that in Hydrochairs the growth takes place intercalarly near the base of the hair.

#### COMPOSITION OF THE ROOT HAIR WALL

Studies of the nature of the cell wall have produced a large amount of conflicting evidence. From the behavior of the hairs

in bursting almost invariably at the tip, and from microchemical studies, however, we may conclude, in general, that the material at the tip differs with that along the sides of the hair. The tip wall substance is probably amyloid in nature, the side wall calcium pectate, while real cellulose may be found at the base of the hair. According to Ziegenspek, *Hydrocharis* again reverses the picture by depositing the amyloid substance at the base, but this is entirely in keeping with the idea concerning the nature of the wall substance in the area of increase of wall substance.

#### CYTOPLASMIC CONTENT OF ROOT HAIRS

In very young root hairs the cytoplasm is very dense and more or less homogeneous. As the hair elongates, vacuoles appear, and most observers report an accompanying activity of the cytoplasm resulting in streaming throughout the cell in both main and cross currents. Within these lines of flow are irregular flocculent masses of material as well as spherical "glistening bodies" of many different sizes. These latter structures are highly refractive and very numerous in root hairs which are produced in alkaline solutions.

It was with this type of cell that Mr. Farr attempted to study the effects of simple nutrient solutions, with the hope of being able to interpret the effect of ions or of small groups of ions upon the process of cell enlargement.

One kind of plant, the very young seedlings of *Georgia Collards*, has been used throughout the experiment. The rate of growth of the aquatic root hairs has been tested in single nutrient salt solutions. The necessity for calcium in the external medium determined the choice of calcium salts in the different experiments performed:

Distilled water

$\text{Ca(OH)}_2$

$\text{CaCl}_2$

$\text{Ca(NO}_3)_2$

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$\text{CaSO}_4$

$\text{Ca(H}_2\text{PO}_4)_2 \cdot \text{H}_2\text{O}$

*Kisser* first demonstrated the necessity for the presence of calcium in root hair formation. After having failed to pro-

duce hairs in chambers of calcium-free glass upon Ca-free cloth, he was able to obtain them abundantly by the addition of very slight traces of Ca. This has been confirmed again and again by both Mr. Farr and myself in repeated failures to produce aquatic root hair growth upon the roots of Georgia Colards in pure distilled water, and their profuse production in very dilute solutions of  $\text{Ca}(\text{OH})_2$ ,—as low as 0.000010 M.

FORMAN T. McLEAN  
*Secretary*

#### MEETING OF MARCH 5

This meeting was held at the American Museum of Natural History with twenty-six members present. President Denslow called the meeting to order at 8:30 P. M.

The following new members were elected:

Mr. A. H. Cockayne, Director, Plant Research Station, Palmerston, North, New Zealand; Mr. John Adam Moore, Department of Botany, Washington State College, Pullman, Washington; Mr. Leon W. Bowen, 77 Evergreen Avenue, Bloomfield, New Jersey; and Mr. C. L. Lundell, Columbia University, New York City.

Dr. J. S. Carling of Columbia University gave a lecture on "Diseases of Characeae." He told some of the puzzling relationships of these organisms and their curious life histories. The lecture was illustrated by lantern slides.

After the lecture, the meeting adjourned to refreshments of coffee and cake, provided by the entertainment committee, served in the bird hall.

FORMAN T. McLEAN  
*Secretary*

#### NEWS NOTES

In this issue we have a short article by Dr. Harshberger on the bracts of *Mendoncia*. Dr. Harshberger had written us of his intended trip to New Zealand and Australia which was to have been started the end of May. In the midst of his plans he was suddenly taken ill and died on April 27th. Since 1892 Dr. Harshberger had been connected with the botanical department of the University of Pennsylvania. He was in his sixtieth year.

The newspapers have recently contained numerous articles on the appearance of the Mediterranean fruit fly in Florida and the quarantine established by the national government in cooperation with the state in the effort to prevent its spread. The fruit fly has been a serious pest in many countries for several centuries past. The fly attacks nearly ripe fruit, laying its eggs in the fruit, where they develop into maggots. As many as 600 eggs may be deposited in a single fruit. Almost any kind of fruit—apples, peaches, cherries, tomatoes, mangos as well as the citrus fruits are attacked. In the regions where the fruit fly has been found all fruit and vegetables will be either destroyed or processed and from areas of nine miles around the infested ones none can be shipped without rigorous inspection and certification.

The gold medal of the Linnean Society of London has been awarded Professor Hugo de Vries, of Lunteren, Holland, in recognition of his work on mutations. (Science)

At the Fifth International Botanical Congress to be held in Cambridge, England, in 1930, motions on the subject of nomenclature will be considered. Such motions, printed in Latin, English, French, German, or Italian must be in the hands of the Rapporteur général, Dr. John Briquet, Conservatoire botanique, Geneva, Switzerland, before September 30, 1929.

At the Allegany School of Natural History in Allegany State Park, western New York, Mr. William P. Alexander has established an Indian Garden which not only shows all of the plants used by the Indians for food, fibers, dyes and medicines, but also tries to show the Indian's ideals of conservation. The Indian medicine man saved seeds of the plants he used and when gathering the plants chanted a song to the effect

"I will not destroy you, but plant your seeds,  
Plant them in the hole from which I take you."

All the world's the stage in "Naturalized Plant Immigrants," a new 3-reel picture just released by the Office of Motion Pictures of the United States Department of Agriculture. From windswept plains of Manchuria to the reeking jungles of the tropics one is taken with the department's plant explorers on a search for plants of potential economic value in

the United States. "Year after year," to quote the final subtitle of the picture, "the search for new plant material goes on, and so are obtained new crops, new foods, new ornamentals, and new raw materials for American farms, markets, arts and industries."

Many citrus producers in California are now keeping records of the production of each tree in their orchards. These individual tree records enable the growers to locate good orange, lemon and grapefruit trees from which to take bud wood for top-working poor trees. In Farmers' Bulletin No. 794-F, Citrus-Fruit Improvement, recently issued by the United States Department of Agriculture, Mr. Shamel describes the methods of keeping and using tree-performance records and comments on the results obtained by those who have followed the practice over a period of years.

On the evening of May 13th a dinner was given in honor of Dr. Aven Nelson at the Commons of the University of Wyoming. The occasion was the 70th birthday of Dr. Nelson. For 42 years he has been connected with the University, part of the time as president. He has built up a large herbarium of the Rocky Mountains and is the author of numerous works on the flora of the Rocky Mountains.

The Botanical Society of America will meet at Dartmouth College, Hanover, N. H., from June 25 to the 28th.

The Pharmaceutical Society of Great Britain has awarded the Hanbury medal "for high excellence in the prosecution or promotion of original research in the natural history and chemistry of drugs" to Dr. Henry Hurd Rusby, professor of materia medica in the college of Pharmacy of Columbia University. It is understood that Dr. Rusby will go to England in October to receive the award. (Science)

A herbarium of 40,000 specimens of plants, owned by Dr. Charles Atwood of Moravia, who died recently, has been presented to Cornell University. The plants were obtained from all parts of the country, but the majority are from central New York. (Science)

Dr. Sam F. Trelease has been promoted to a full professorship of botany in Columbia University.

# THE TORREY BOTANICAL CLUB

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